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Relocation and characteristics of recent earthquake sequences (2013, 2014) on the North Gulf of Evia, Greece

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This work presents the results of relocation and stress inversion analysis for two recent earthquake sequences in the northern Gulf of Evia, central Greece. On 12 November 2013 (18:09, UTC) a moderate earthquake, ML=4.8 occurred onshore northern Evia, near the village Taxiarxis. The epicentral area of this event was manually located: φ=38.9133° , λ=23.0977° at depth 14 km, according to NOA. For a period of one month there were 155 aftershocks with magnitude ML>0.5, while the first day there were 85 earthquakes; the largest of them with magnitude ML=3.9. On November 17, 2014, two shallow earthquakes with magnitude ML=5.2 occurred inside the northern Gulf of Evia, about 34 km NW of Chalkis town. For the location of above events broadband data from HUSN network were used. The relocation for both sequences was done by use of the NonLinLoc software of Lomax etal. (2000). For this purpose a local velocity model was used, calculated in the past by traveltime inversion techniques. For the 2013 seismic sequence the phase data from National Observatory of Athens include more than 12700 P and 4800 S – wave arrivals. Only events with at least 8 P–wave and 4 S–wave arrival having an azimuthal gap lower than 180°, location RMS lower than 0.8 sec and vertical and horizontal errors lower than 1.5 km were selected for processing. A NNW-SSE near-vertical fault was revealed after relocation. The second part of this study refers to the calculation of the moment tensor solutions for the main events as well as for the strongest aftershocks of the 2014 seismic sequence. Seismological broadband data from the Hellenic Unified Seismological Network were collected and analyzed in order to determine the source parameters of the events that occurred in the study area. We selected and analyzed the data of 10 broadband seismological stations with three components. The source parameters were calculated based on a moment tensor inversion, using regional waveforms at epicentral distances less than 3°. For several aftershocks the inversion indicated the activation of a normal fault with strike almost E – W. Finally. the third part of this study includes some statistical results on the properties of the 2014 aftershock sequence using the ZMAP software, such the b-value and the p-value (rate of aftershock decay).

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